CURRENT CLAIMS

A copy of the claims is provided below for the convenience of the Examiner. The claims are not amended.

1.   (Original)   A method, comprising:

decomposing a signal comprising a plurality of process variable measurements into a plurality of resolution levels, the process variable measurements associated with operation of a valve;

grouping the resolution levels into a plurality of groups; and

identifying one or more defect indicators for at least some of the resolution levels using the groups, the one or more defect indicators associated with a possible defect in the valve.

2.   (Original)   The method of Claim 1, wherein:

decomposing the signal comprises performing wavelet decomposition to generate wavelet coefficients at each of the resolution levels;

grouping the resolution levels comprises grouping the wavelet coefficients into groups; and

identifying the one or more defect indicators comprises performing singularity detection using the groups of wavelet coefficients.

3.   (Original)   The method of Claim 1, wherein the process variable measurements comprise measurements of a flow rate of one or more materials flowing through the valve.

4.   (Original)   The method of Claim 1, wherein the one or more defect indicators identify one or more jumps in the process variable measurements.

5.   (Original)   The method of Claim 4, wherein the one or more jumps represent one or more deterministic signal changes where the process variable measurements change by a threshold amount within a given time period.

6.   (Original)   The method of Claim 1, further comprising:

selecting one of the resolution levels; and

determining a probability of a valve defect based on the defect indicators at the selected resolution level.

7.   (Original)   The method of Claim 1, wherein grouping the resolution levels into the plurality of groups comprises grouping the adjacent three resolution levels into groups, the groups forming overlapping groups where at least some of the resolution levels form part of two or more groups.

8.   (Original)   An apparatus, comprising:

one or more processors collectively operable to:

decompose a signal comprising a plurality of process variable measurements into a plurality of resolution levels, the process variable measurements associated with operation of a valve;

group the resolution levels into a plurality of groups; and

identify one or more defect indicators for at least some of the resolution levels using the groups, the one or more defect indicators associated with a possible defect in the valve; and

a memory operable to store the one or more defect indicators.

9.   (Original)   The apparatus of Claim 8, wherein:

the one or more processors are collectively operable to decompose the signal by performing wavelet decomposition to generate wavelet coefficients at each of the resolution levels;

the one or more processors are collectively operable to group the resolution levels by grouping the wavelet coefficients; and

the one or more processors are collectively operable to identify the one or more defect indicators by performing singularity detection using the groups of wavelet coefficients.

10. (Original)   The apparatus of Claim 8, wherein the process variable measurements comprise measurements of a flow rate of one or more materials flowing through the valve.

11. (Original)   The apparatus of Claim 8, wherein the one or more defect indicators identify one or more jumps in the process variable measurements.

12. (Original)   The apparatus of Claim 8, wherein the one or more processors are further collectively operable to:

select one of the resolution levels; and

determine a probability of a valve defect based on the defect indicators at the selected resolution level.

13. (Original)   The apparatus of Claim 8, wherein the one or more processors are further collectively operable to generate a second signal and supply the second signal to a valve adjuster, the valve adjuster operable to use the second signal to adjust an opening of the valve.

14. (Original)   The apparatus of Claim 8, wherein the one or more processors are collectively operable to group the resolution levels into the plurality of groups by grouping the adjacent three resolution levels into groups, the groups forming overlapping groups where at least some of the resolution levels form part of two or more groups.

15.   (Original)   A computer program embodied on a computer readable medium and operable to be executed by a processor, the computer program comprising computer readable program code for:

decomposing a signal comprising a plurality of process variable measurements into a plurality of resolution levels, the process variable measurements associated with operation of a valve;

grouping the resolution levels into a plurality of groups; and

identifying one or more defect indicators for at least some of the resolution levels using the groups, the one or more defect indicators associated with a possible defect in the valve.

16.   (Original)   The computer program of Claim 15, wherein:

the computer readable program code for decomposing the signal comprises computer readable program code for performing wavelet decomposition to generate wavelet coefficients at each of the resolution levels;

the computer readable program code for grouping the resolution levels comprises computer readable program code for grouping the wavelet coefficients; and

the computer readable program code for identifying the one or more defect indicators comprises computer readable program code for performing singularity detection using the groups of wavelet coefficients.

17.   (Original)   The computer program of Claim 15, wherein the process variable

measurements comprise measurements of a flow rate of one or more materials flowing through

the valve.

18.   (Original)   The computer program of Claim 15, wherein the one or more

defect indicators identify one or more jumps in the process variable measurements.

19.   (Original)   The computer program of Claim 15, further comprising computer

readable program code for:

selecting one of the resolution levels; and

determining a probability of a valve defect based on the defect indicators at the selected

resolution level.

20.   (Original)   The computer program of Claim 15, further comprising computer

readable program code for generating a second signal and supplying the second signal to a valve

adjuster, the valve adjuster operable to use the second signal to adjust an opening of the valve.

21. (Original) A system, comprising:

a valve;

a measuring device operable to generate a signal comprising measurements of a process variable associated with operation of the valve;

a controller operable to generate output values for adjusting the valve based on the process variable measurements; and

a defect detector operable to:

decompose the signal into a plurality of resolution levels;

group the resolution levels into a plurality of groups; and

identify one or more defect indicators for at least some of the resolution levels using the groups, the one or more defect indicators associated with a possible defect in the valve.

22. (Original) The system of Claim 21, wherein the defect detector forms part of the controller.